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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,364	07/26/2001	Hiroyuki Sakuyama	211429US2	6940
22850	7590	10/18/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			HUNG, YUBIN	
			ART UNIT	PAPER NUMBER
			2625	104

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/912,364

Applicant(s)

SAKUYAMA, HIROYUKI

Examiner

Yubin Hung

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14, 15, 21-24, 30, 31, 50 and 51 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5-9, 11-13, 16-18, 25, 27-29, 32-38, 41-45, 47-49, 52 and 53 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 10, 19, 20, 26, 39, 40 and 46 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/26/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>#5 - #13</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

2. The disclosure is objected to because of the following informalities:

- P. 1, line 27 & P. 19, line 2: "PGB" should have been "RGB"
- P. 10, line 13: "he " should have been "The"
- P. 2, line 22 & P. 21, line 4: "GBR" should have been "RGB"
- Claim 9, line 3: the phrase "a plurality of quantization" is erroneously underlined

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5-8, 11, 27, 35, 41-44, 47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 5 and 41 recite the limitation "said color difference" in their respective line

6. There is insufficient antecedent basis for this limitation in the claim. Claims 6-8, dependent from claim 5, and claims 42-44, dependent from claim 41, are similarly rejected. (For examination purpose, "said color difference" will be interpreted as "a color difference.")

6. Claims 11, 27 and 47 recites the limitation "said color difference" in their respective line 2. There is insufficient antecedent basis for this limitation in the claim. (For examination purpose, "said color difference" will be interpreted as "a color difference.")

7. Claim 35 recites the limitation "said color difference" in line 7. There is insufficient antecedent basis for this limitation in the claim. (For examination purpose, "said color difference" will be interpreted as "a color difference.")

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 9, 12, 25, 28, 45 and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by Davidson et al. (US 6,246,345).

10. Regarding claim 25, and similarly claims 9 and 45, Davidson discloses

- quantizing said component color image signal under a quantization level number different for each of a plurality of quantization regions specified by a value of said component color image signal corresponding to a polarity change of said component color image signal [Fig. 9C. Col. 18, lines 62-65. Note that for the quantization number for region to the left of polarity change (i.e., $x < 0$) is different from that of the region to the right. Note further that the method, while intended for quantizing digital audio signals, is inherently applicable to image signals since both are digital signals]

11. Regarding claim 28, and similarly claims 12 and 48, Davidson further discloses

- linearly quantizing said component color image signal in at least one of a plurality of quantization regions specified by a value of said component color image signal, as a threshold, corresponding to at least one of a polarity change and a maximum of said polarity change [Fig. 9C. Note that the region to the left of a polarity change, i.e., color component signals with a value less than zero, are linearly quantized]

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1, 2, 18, 34, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwakami et al (US 5,684,920) and Davidson et al. (US 6,246,345).

14. Regarding claim 18, and similarly claims 1, 34 and 37, Iwakami discloses:

- quantizing said component color image signal thereof such that a color difference per unit error caused by quantization of said component color image signal is within a predetermined value [Fig. 22, numerals S1-S3; Col. 22, lines 1-16. Note that for a color component V, a quantization error (i.e., color difference) of Q being less than a predetermined value of T is equivalent to $Q/\Delta V$ (i.e., color difference per unit) being less than $T/\Delta V$. Note further that the method, while intended for quantizing audio signals, is applicable to image signals since both are digital signals]

Iwakami does not expressly disclose that quantization is performed over a plurality of regions.

However, Davidson teaches/suggests quantization over multiple regions. [Fig. 9C.

Note that there are multiple regions between -1.000 and 1.000.]

Iwakami and Davidson are combinable because they both have aspects that are from the same fields of endeavor of quantization of digital signals.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Iwakami with the teachings of Davidson by performing quantization over a

plurality of regions. The motivation would have been to minimize quantization error so that the resulting distortion is within an acceptable range.

Therefore, it would have been obvious to combine Davidson with Iwakami to obtain the invention as specified in claim 18.

15. Regarding claim 2 and similarly claim 38, they are rejected per the analysis of claims 1, 13, 34 and 37 above because the combined invention of Iwakami and Davidson quantizes all component color image signals, which certainly include the low frequency components.

16. Claims 13, 16, 17, 29, 32, 33, 36, 49, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagami et al. (US 5,072,290).

17. Regarding claim 29, and similarly claims 13, 36 and 49, Yamagami discloses

- quantizing one of said plurality of component color image signals depending on other component color image signals which are not presently quantized
[Fig. 1, numeral 14Y; Col. 1, lines 54-64; Col. 4, lines 20-24. Note that the quantization of a color image component, say Y, is controlled by the allowable quantization error δY , which depends on the other two components R-Y (as *ry*) and B-Y (as *by*). Note further that while quantizer 14Y directly quantizes the difference of successive Y values, it would have been obvious to one of ordinary skill in the art to modify the quantizer to quantizes Y values directly; the motivation would have been to save on hardware implementation cost.]

18. Regarding claim 32, and similarly claims 16 and 52, Yamagami further discloses

- quantizing said first component color image signal and a distance of a position from a locus of points of equal values of said first and second component color image signals, said position

corresponding to said first and second component color image signals on a plane specified by said first and second component color image signals
[Fig. 1, numerals 14Y, 14R. Note that Y is considered the first component and R the second component. Note further that for any Y value, say $Y=a=(\sqrt{2}) \cdot 10$, the distance of position (a, 0), which is on the YB-plane, to the locus defined by $Y=R$ is 10, a value within the range of Y as indicated in, Fig. 3 and would have been quantized by quantizer 14Y]

19. Regarding claim 33, and similarly claims 17 and 53, in addition to disclosing all limitations of its parent, claim 32, Yamagami further discloses

- quantizing at least one of a difference between said first and second component color image signals, and either one of said first and second component color image signals
[Fig. 1, numerals 14Y and 14R. Note that 14R quantizes the difference, $R_Y (=Y - R)$, between the color components Y and R]

Allowable Subject Matter

20. Claims 14-15, 21-24, 30-31, 50-51 are allowed.

21. Claims 3-4, 10, 19-20, 26, 39-40, 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. Claims 5, 35, 41 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action; this would also make their dependent claims 6-8 and 42-44 allowable since they inherit the rejection(s) under 35 U.S.C. 112, 2nd paragraph.

23. Claims 11, 27 and 47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form as well as to overcome

the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

24. The following is an examiner's statement of reasons for allowance:

25. Regarding claim 30, and similarly claims 14 and 50, the prior art of record fails to teach or suggest, alone or in combination, a method for processing a plurality of component color image signals comprising, along with other limitations:

- quantizing one of said plurality of component color image signals depending on a position thereof on a plane identified by a subsection of said plane; said plane being specified by said plurality of component color image signals, as parameters, and divided into a plurality of said subsections with respect to a locus of maximal points of a color difference per unit error caused by a quantization error of said component color image signal to be presently quantized

26. Regarding claim 21, the prior art of record fails to teach or suggest, alone or in combination, a method for processing a component color image signals comprising, along with other limitations:

- quantizing said component color image signal under a quantization level number different for each of a plurality of quantization regions specified by a value of said component color image signal corresponding to a maximum of a color difference per unit error caused by quantization of said component color image signal

Closest art of record Yamagami et al. (US 5,072,290) discloses using allowable quantization error (such as measured by L*a*b color difference, for example) to guide subsequent quantization. [See Col. 1, lines 54-64.] However, Yamagami does not teach using the maximum of the quantization error to partition the color component

signal values into regions so that each region can be assigned a different quantization level number.

27. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

28. The following is a statement of reasons for the indication of allowable subject matter:

29. Regarding claim 19, and similarly claims 3, 10, 26, 39, 46, the prior art of record fails to teach or suggest, alone or in combination, a method for processing a component color image signal comprising, along with other limitations:

- computing said color difference per unit error by averaging color differences over all values of G as a parameter among components R, G and B

30. Regarding claim 20, and similarly claims 4, 11, 27, 40, 47, the prior art of record fails to teach or suggest, alone or in combination, a method for processing a component color image signal comprising, along with other limitations:

- obtaining said color difference per unit error as an envelope drawn through maximal points of color difference versus component color image signal plots for all values of G as a parameter among components R, G and B

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
October 12, 2004



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